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AN
ACCOUNT
OF
THE NEUTRAL SALINE WATERS
OF
HAMPSTEAD.

C. and R. Baldwin, Printers,
New Bridge-street, London.



F. Cheesman, sc.

View at Hampstead, near the New Medicinal Springs. 1803.

AN
ACCOUNT
OF
THE NEUTRAL SALINE WATERS
RECENTLY DISCOVERED AT
HAMPSTEAD;

WITH

Chemical Experiments on their Component Parts, observations on their Medicinal Application and Effects in certain Diseases, and on the different Modes of Bathing, as an Auxiliary to the drinking of Mineral Waters.

BY THOMAS GOODWIN,
MEMBER OF THE ROYAL COLLEGE OF SURGEONS,
IN LONDON.

Neque vero negligentiores se circa aquarum
facultates cognoscendas exhibere convenit.

HIPPOCRATES.

London:

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J. AND J. RICHARDSON, ROYAL EXCHANGE; AND AT
THE DIFFERENT WATERING PLACES.

1804.



ADDRESS.

The following work, which has been announced for eighteen months past, can satisfactorily be proved, by several respectable persons, to have been completed above six months ago, excepting some slight alterations and additions. It was then put into the hands of some people in London, and was ready for the press, but I have learnt that my plans, &c. while there, were unguardedly exposed; and I have also great reason to believe, that had the experiments been with the rest of the work, I should have been anticipated by a copy of my own Analysis; but it being given to my friend Dr. GEORGE PEARSON (who is generally acknowledged the British Lavoisier) for his inspection, some of the Experiments were repeated by him in the early part of last summer, and he gave me to understand that he would examine the whole before the end of July,

and I fully expected to have had the publication out by that period: but, in consequence of unexpected and very pressing engagements, Dr. PEARSON was not enabled to attend to the remainder in the manner he wished until very lately. This alone delayed the publication. It was also my known design, prior to my manuscript being in London, not only to offer this little work, but also another of a much more extensive nature, which was intended to embrace many circumstances connected with all the Medicinal Waters I had examined in this country, as well as an account of some others on the Continent, for which I had made several arrangements.

TO THOMAS KEATE, ESQ.

SURGEON TO THE QUEEN AND PRINCE OF WALES.

SIR,

FROM the intimate friendship with which you have long and uniformly honoured my uncle, and your almost paternal kindness to my brother and myself, while in his Majesty's service, during the time that you were inspector General of Army Hospitals, I am induced to dedicate to you this little work. It presents at the same time an opportunity, which I gladly embrace, of publicly acknowledging the many favors received at your hands. These private considerations apart, I am also further induced to take this liberty, from that generous regard which you have, on all occasions, evinced, to promote every good and salutary design.

The time and encouragement given by you to the Vaccine Institution, is among many others, a proof of what I assert. On these grounds, I trust, that the newly discovered waters of Hampstead may be found not unworthy of your patronage and attention.

I have the honour to be,

With profound respect,

SIR,

Your most obedient,

And very humble servant,

THOMAS GOODWIN.

NEUTRAL SALINE WATERS

OF

HAMPSTEAD.

WHEN I first intimated to the inhabitants of Hampstead my intention of publishing some account of the Medicinal Springs, which I had discovered, I had no other view than merely to state the component parts of the waters, and their practical utility in diseases, to the inhabitants of the village only; but after experiencing their efficacy in innumerable instances, and reflecting upon the diffusive good likely to accrue to the inhabitants of a great capital almost contiguous to them, I concluded that it would be more judicious, and, upon principles of philanthropy, more benevolent to submit it to the attention of the people of

London, and new comers to this village : for to the regular residents of Hampstead the Springs must be universally known, when they are publicly opened for the convenience of those who, from various infirmities, may have occasion to resort to them.

It is true, that enquiry has been made, by what means I became acquainted with the Springs, and how these waters, which must have existed for ages, should, in a populous neighbourhood, have hitherto remained undiscovered. In reply to such persons, I must beg leave to inform them, that for many years past, I have devoted much of my attention to the curative effects of Mineral Waters, in almost numberless diseases, more especially in those obstinate complaints termed Chronic, and which often baffle the best efforts of the most able and experienced of the profession.

Having passed the greater part of my life at

Hampstead, I was often led, in my frequent walks on the Heath, to inspect the soil where labourers were digging for gravel, sand, loam, &c. and having long observed the variety of strata in different parts of the village; was irresistibly led to conclude, that Purgative Springs might possibly exist as well as Chalybeate, and knowing that nature has lavished her bounties on some favoured tracks of ground, and that considerable benefit might result to the community from the discovery of such waters, I made it my constant practice, for years, to taste every water I met with, whether in fosses about the heath, reservoirs in yards, pumps in gardens, houses, &c. and found some of various tastes and qualities that had certain effects upon the health and spirits, but none that were sufficiently impregnated to be recommended to public notice (excepting chalybeates*) until I

* This village is supplied with chalybeate springs in almost every direction, some of which are as strongly impregnated as those in the Well Walk.

discovered the Neutral Saline Springs, now under consideration, at the south-east extremity of the heath near Pond-strect.

As my mind had often been much impressed with the utility the people of almost every country derive from similar salubrious fountains, and as I observed that writers on mineral waters rarely agree in their opinions, respecting the component parts, or on the diseases for which they are to be recommended, (and indeed this is not surprising, as several have written expressly on mineral waters, the springs of which they never visited,) it occurred to me that it was necessary, if I wished to be more justly informed, to travel over the kingdom, and visit the most frequented, for the purpose of examining them by re-agents, and collecting the matter of evaporation, from a portion of each, at their respective spring heads, which I have done at a considerable expence, disregarding my own immediate interest, from a desire of being useful to others.

During the years 1802-3, I resorted to and examined the medicinal waters of Tunbridge, Brighton, Bath, Bristol, Cheltenham, Malvern, Thorpe Arch near Ferry Bridge, Harrowgate, Scarborough, St. Bernard's Well Mid Lothian, about half a mile from the New Town Edinburgh; Moffat on the banks of the Annan in Dumfriesshire; St. Winifred's, Flintshire, North Wales; Buxton Baths, Matlock, Keddlestone in Lord Scarsdale's Park, and Quarndon in the neighbourhood of Derby.

In respect to the saline waters of Hampstead, from various experiments made with them, compared with others which I also made at the Cheltenham saline springs in December 1802, and from its medicinal effects on the constitution, it appears that the saline waters of this place have an affinity to the saline spa at Cheltenham, to which his Majesty resorted, by the advice of his physician the late Sir George Baker, in the summer of 1788.

I mention the saline spa at Cheltenham, to distinguish it from the simple carbonated chalybeate, which has not yet been much attended to, as the celebrity of the saline waters at that place has been long established in the cure of bilious complaints, hypochondrical affections, worm cases, &c. and is according to the report of persons from tropical climates, nearly as well known in the East and West Indies, as at Gloucester or London.

Now, as these saline waters at Hampstead resemble those at Cheltenham, they must, from contiguity to so populous a city as London, be of peculiar advantage to the inhabitants of the Metropolis and its vicinity, more especially as they are barely three miles distant from the most extended part of the town; neither is it an unreasonable presumption to state that a very considerable portion of the inhabitants may expect to be essentially benefited, by having recourse to these springs, so cminently calculated

to relieve complaints arising from too copious, or too stimulant ingesta, or, in other words, diseases connected with the stomach and biliary functions; the usual companions of wealth and indulgence.

One of the most skilful hydro-analysts of modern times, considered the advantages of the medicinal sulphureous waters of Enghien, in Montmorency as almost incalculable, on account of their being situated in an agreeable country, and within fifteen miles of Paris, a distance which he deemed trifling when health was the object; but supposing others might be surprised at the extent of his voluminous Analytical Treatise, he observes, “ On ne sera point étonné, de l’étendue que nous avons donnée à ce travail, si l’on fait attention, à l’importance, & à l’utilité que peut avoir au voisinage de la capitale, & dans une campagne la plus agréable, & la plus favorisée de toutes celles qui l’entourent, une source d’eau Minérale qui peut au moins être comparée par sa

nature & par ses propriétés, à celles que l'on fait venir de très loin & à grands frais."* Now in point of interesting scenery, atmosphere, and possession of mineral springs, Hampstead must be allowed to bear some similitude to this highly commended spot; and, as the distance is only a fifth part, it cannot surely be deemed less favourable or convenient.

MINERAL WATERS.

Mineral waters have in all ages been held in great estimation, and highly valued by mankind for the cure of diseases; and when we contemplate the numbers that have received cures, even after pharmaceutic preparations had been administered in vain, it is not surprising that many entertain so great a predilection for their virtues, and that others hold them in a degree of sanctity, as almost infallible specifics prepared by the hand of nature, and superior to all other remedies. Superstitious prejudices ought certainly to be restrained; but it is

* Fourcroy.

not to be denied that they are most suitably prepared by the wise Author of our existence, to expel many of the evils which often assail the human frame : therefore, not to appreciate them as they deserve, is little short of rejecting a boon (health) superior to every other good ; for what are honours and wealth but splendid mockeries, when the poor possessors are oppressed and labouring under some painful disease.

Can any one distrust its worth ?
Consult the monarchs of the earth ;
Imperial Czars, and Sultans own,
No gem so bright, that decks their throne ;
Each for this pearl his crown would quit,
And turn a rustic, or a cit.

Cotton.

Perhaps this has often arisen from gratitude in the minds of those who have been essentially benefited by their application, but candour must acknowledge that diseases frequently occur that no mineral waters can cure, however skilfully applied, though, in a great variety of instances, they certainly merit a fair trial.

The illustrious and indefatigable Boyle expended much time in making researches into, and examining these aqueous compounds of nature, and both Lister and Hoffman, physicians of cool judgment and great penetration, have stood forward as their decided advocates, declaring them, from ample experience, and the most pointed success in their use, to be eminently serviceable in the cure of diseases in persons of different ages and constitutions; but to be used with caution and discretion to prevent their proving prejudicial.

The celebrated Mead observed “ that those preparations which have power to act beneficially, in the same ratio necessarily do harm if unskillfully exhibited;” and Boyle remarks, in addressing himself to his friend upon mineral waters, “ however since you will needs have me “ say something upon this subject, since it is a “ noble one, as that wherein the health of thou- “ sands is concerned; since it is of late grown

“ to be more prized and discoursed of than ever,
 “ and though many may look upon them as such
 “ innocent medicines, as if they do no good,
 “ can at least do no harm; yet the effects that
 “ have too often ensued the unskilful use of
 “ them, especially when it was long continued,
 “ allow me not to look upon the drinking of
 “ them as a slight thing, that may safely be
 “ plaied with, but as that whereby we have seen,
 “ as very much good, so a great deal of mis-
 “ chief done. I look therefore upon the examen
 “ of the properties, and other qualities of mine-
 “ ral waters, as a thing that is of the greatest
 “ importance.” From inattention to the above,
 they have often disappointed the sanguine expect-
 ations of the patient and his friends, merely
 through his own unadvised misconduct.

However in those cases where the powers of
 life are not too much exhausted, and persons
 apply to them with proper confidence, and assist
 their benign operations by suitable diet, gentle

exercise in the open air, when the weather will permit, regular hours, &c. and above all by avoiding as much as possible painful and anxious thinking, and whatever has a tendency to the reproduction of grief, or corroding cares, have great reasons to expect the most advantageous effects to result from resorting to these salubrious fountains.

As most strangers must be unacquainted with the new medicinal springs, I have annexed an engraving of Pond-street, that they may be directed to the spot with greater facility.

The map is intended for the use of those persons who resort to Hampstead for the season, and to whom the rides and neighbouring villages may be unknown.

I am indebted to a young lady for the delineation of Pond-street.



HAMPSTEAD.

This Village from its vicinity to London is well known, but as it has been usual with those who have published the first experiments on a medicinal spring to describe the adjacent country,* I feel myself impelled by coercive example to give some description of it.

HAMPSTEAD, from its romantic irregularity and variety of appearance, has generally and justly

* This is particularly required by an author of acknowledged high repute, in his instruction to others, respecting the description of a medicinal spring.

A branch of enquiry of considerable importance is that of site, under which term may be included all that relates to soil, general state of the atmosphere, purity of air, and face of the country around the spot enriched by this natural treasure, and which are circumstances of no small importance to the invalid, since the advantages of air and exercise, and agreeable prospects, in most cases, admirably coincide with the general curative effects of the spring itself."

DR. SAUNDERS.

been admired by all persons, foreigners as well as natives, possessing taste for the beauties of rural scenery.

It is situated on the declivity of a hill, four miles north of London, is populous, large, and affords abundance of beautiful perspective, with a rich variety of local views, consisting of broken ground, intersected by inclosures, lawns, groves, and gardens, and embellished with numerous elegant villas.*

On the summit of the hill, or heath, many fine surveys of the surrounding country present themselves; nor is the mild aspect of the vale below unworthy of regard.† From this elevated ground, part of the county of Essex and the Metropolis is seen to great advantage, and, on a clear day, an accurate eye may plainly perceive

* There are also many convenient lodging houses, very pleasantly situated, in different parts of the village.

† The vale of health.

the winding of the Thames, by the white canvas of the shipping moving on its surface. Beyond the city appear the wood clad hills of Norwood. Nor are these the only beauties of this delightful spot; several picturesque objects give considerable lustre to the projecting front of Highgate, clothed with verdure, and boldly appearing as a first distance; from which in gentle descending slope, the chearful swelling hills, and adjoining vales retire, till lost in the remote horizon.

On the opposite side, to the north-west, lofty Harrow presents itself, and Windsor Castle may be seen, with a considerable portion of the counties of Buckingham, Bedford, and Northampton. A few paces further, by the side of a little wood on the left hand road, before descending the hill leading to North End, a charming prospect opens towards the north. From the eastern extremity of the Well Walk, Fitzroy Farm, and the adjacent woodlands form a sweet appearance. From

Shepherd's fields* an extensive variety of interesting landscape may be also seen over a distance of many miles, with the woody hills of Surry and Kent ; in short, it is impossible to ramble about this diversified village without incessantly meeting with hill and dale, some beautiful object, or some wildly luxuriant prospect in continual change.† Many of the walks are umbrageous,

* In Shepherd's Fields there is a reservoir of the purest soft spring water, equal to any in the kingdom, that receives a fresh supply of several tons daily. This water never freezes in the severest winters, it incorporates completely with soap, and its specific gravity is but little more than that of distilled water ; and, although not recommended medically, yet from its intimate diffusion with the human fluids, it will eventually be found very effectual for general use, for persons disposed to calculous complaints.

As there is a sufficiency of this water to supply a bath, it is much to be lamented that one has not been constructed !—What a valuable acquisition would it form for the health and comfort of the inhabitants ?

† Of late years some persons were beginning to deform the beauty of the village by erecting high close fences about the fields ; others were following the example with such rapidity, that in twenty years we should have had little to boast of, ex-

and offer a sheltering retreat either to the invalid or healthy even in the most sultry weather. Among these may be mentioned the promenade or terrace walk, which is exceedingly pleasant, and has often been much frequented by people of fashion, especially on summer evenings. To add to the enlivening gaiety of the whole, a band of music has sometimes attended.

The rides are agreeable, and the roads excellent.

Hampstead has often employed the pen of poetic genius, nor was the sister hill forgot, by that elegant master of descriptive imagery, who informed the page with music, sentiment, and

cepting dismal lanes, and other dangerous passes. Fortunately this was soon put a stop to, by the spirited interference of some of the most respectable inhabitants, who highly merit the thanks of their neighbours. It is to be hoped this will not be attempted again. Indeed there would be but few high close fences erected, even around pleasure grounds, was health more consulted. Open railed fences admit of ventilation by the air circulating freely, than which nothing is more conducive to the health of both man and vegetables.

thought, and poured the whole luxuriance of nature into his inimitable Seasons.

It was the favourite retirement of the classic *Æsculapian* bard, cum multis aliis, whose refinement and taste have done honour to themselves, and delighted their numerous readers. But what at present adds more than all to the advantages of the place, especially to invalids and their families, is its medicinal springs ; one, a valuable neutral purgative, the other, an excellent simple chalybeate,* without any saline matter ;

* I wish, in this place, to recommend a superior mode of taking these waters, and which, if adopted, will be found rather to heighten and improve their qualities.

It is well known that many delicate stomachs, (and most of those who require these waters, have that organ in an enfeebled state,) cannot bear these natural remedies quite cold, without experiencing a disagreeable chill, and an oppressive load throughout the day ; and in consequence of such unfavourable sensations, the waters have been frequently given up, as not acting in a salutary manner. This I have repeatedly observed with respect to the chalybeate water, and, in such cases, I have usually advised it to be drank about the warmth of new milk, the result has been, in most trials, that taken in that way they

and whose tonic effects, (particularly in female and other complaints, arising from mere debility) I have for many years observed, as well as my uncle, Mr. George Goodwin, whose practice was extensive, in this village for nearly forty years.

have not disordered the stomach, but agreed with the patient very well: and by continuing their use for some time, the nervous powers have become invigorated, and the stomach sufficiently strengthened to receive them with pleasure, even in a cold state, and the patient has ultimately received a radical cure. Another important part of this practice is, that the waters may be drank by invalids who reside here, with nearly the same success in the coldest weather; whereas by the plan hitherto recommended, they are uselessly flowing nearly half the year.

I am persuaded that nature, in her bounty, has intended them for relief in every season, by impregnating them with peculiar properties, that the coldest weather has not power to shut them up from our service.

These waters are excellent for weakly women who are desirous of being mothers.

The manner in which I have recommended them to be warmed, is by immersing the bottle, containing the mineral water well corked, into a jug of hot water, and to drink them the moment they are poured into a glass.

Hampstead may now, with great justice, be esteemed equal to Cheltenham, Scarborough, Tunbridge, or Harrowgate, for the efficacy of its mineral waters; to the first two it bears a surprising resemblance, by possessing the same kind of springs, namely, a purgative saline, and a simple chalybeate.

The soil of Hampstead is, in general, dry, and bears a great likeness to its surface, as few parts can be found entirely alike; but, taking the tout ensemble, it is chiefly composed of gravel, sand, clays, and loam; each of several colours and kinds, peat earth, pyrites, &c. and there is a strong presumption from chalybeate springs

In all cases, cleansing the *primæ viæ* (first passages) by premising the Pond-street water for a week or ten days, the chalybeate water will be attended with fairer prospect of success.

Residing nearly between the saline and chalybeate springs, I am enabled to observe, and constantly attend to their effects.

abounding, that in the bowels of the earth are considerable depots of ferruginous matter.*

Connoisseurs have sometimes found among the gravel, cornelian, agate, and various other valuable stones, similar to those brought from the east, and other foreign countries. This place also affords much amusement to the botanist, from the spontaneous vegetation of medicinal and other indigenous plants. Some of those beautiful plants called heaths (the *Erica* of Linnæus) are nearly equal to those brought from the Cape and the Mediterranean.

The ponds are large and deep,† and afford

* Since writing the above, I have found irony coloured sand stone rock, in considerable quantities in some few parts of the heath.

† These ponds are extremely dangerous, and have been fatal to many. Bathers often unexpectedly meet with shelvings that descend nearly perpendicularly, and being surprized and

sport to anglers. The pasture, on the common, is very good, and supports numbers

terrified at their dangerous situation, are almost immediately drowned; and only, a few weeks since, a fine promising youth perished here in this manner, and left an affectionate father and family, to deplore his loss. Two of his companions were in the water at the same time, but they could do nothing to save him.

I most earnestly entreat that no persons, but the most expert swimmers, will ever again venture in them, and I trust they will listen to me upon this subject, although they have hitherto neglected the caution of the Humane Society; if through temerity or thoughtlessness, they disregard their own safety, yet let me implore them to reflect, for a moment, before they strip (perhaps never to dress again but in their shroud) upon the distraction and agony of their parents left behind. A miserable sight I have too often witnessed upon the banks of these ponds!

Drowning has been experimentally proved to produce death (indirectly) by excluding the atmospheric air from the lungs, and not, as generally imagined, by the water rushing into, and filling the body.

Therefore, holding up the body by the legs to drain off the water, as is frequently done before medical assistance can be procured, is highly mischievous; and as it is impossible

of horses, cows, and other animals, that are seen roving and grazing at all times of the year;

to disseminate too widely the latest abbreviated means recommended by the Humane Society, for the recovery of unfortunate persons who have been submerged, I shall beg leave to insert them in this place.

Convey quickly and carefully the body, with the head raised, to the nearest convenient house.

Strip and dry the body, clear the nose and nostrils, lay the body on a blanket or bed, and in cold weather near the fire. In the warm season, air should be freely admitted. It is to be gently rubbed with flannel, sprinkled with spirits, and a heated warming pan covered, lightly moved over the back and spine.

To restore breathing, introduce the pipe of a pair of bellows (when no apparatus) into one nostril, the other with the mouth closed, inflate the lungs till the breast be a little raised; the mouth and nostrils must then be let free. Repeat this process till life appears.

Tobacco smoke is to be thrown gently up the body with a proper instrument, or the bowl of a pipe covered, so as to defend the mouth of the assistant. The breast to be fomented with hot spirits; if no sign of life appears, the warm bath, or hot bricks, &c. should be applied to the hands and soles of the feet.

On signs of returning life, a tea-spoonful of warm water

and which cannot fail to produce in the mind of the beholders, a gratifying, social, and rural impression. Hares are often found among the furze, and the hounds being sometimes out during the season, constitutes a healthy, though, in a moral point of view, not very benevolent pastime.

Few situations in England possess a better air*

may be given; and if swallowing be returned, warm wine, or diluted brandy. Young children to be put between two persons in a warm bed. The above plan to be used for three or four hours.

* Air, near the surface of the earth, is now known to be a compound aeriform fluid, capable of rarefaction and condensation; the rarefaction of air is surprisingly great. Mr. Boyle in one of his experiments found that it occupied 13,680 times its former volume (*a*), whose density diminishes as its height encreases, is ponderous, yet weighing eight hundred and thirty times less than water. It surrounds the earth on all sides, and is compressed by its incumbent columns, perpendicularly and laterally, it enters with great force wherever it meets with

(*a*) If a flaccid or half blown bladder be exposed to the action of caloric, the air will be dilated so as to burst the bladder. See *Accum's Chemistry*.

than this village. It is at most seasons of the year exhilarating, clear, and healthy. Its high situation in part renders it so.

less resistance. Its pressure on the human body has been variously estimated by philosophical men; but at its lowest computation is equal to several thousand pounds weight. (a) It holds in solution water impregnated with salts, sulphur, the different products of putrefaction, &c. and although invisible, inodorous, and colourless, yet it takes up part of most bodies with which it comes in contact, or rather forms a receptacle of all the effluvia from terrene substances. After carefully separating its adventitious ingredients, it is found composed of two gases, or elastic fluids, called oxygene and nitrogene, (b) the one fit for respiration and combustion, and contributing to the support of animal life, by some called the air of fire; the other, which extinguishes or destroys both, existing in the proportion of twenty-seven in a hundred of oxygene or pure vital, to seventy-three of nitrogene, azote, or nonrespirable. A com-

(a) For the pressure and other effects of the changes of the atmosphere upon human bodies. See Mead de Imperio Solis ac Lunæ in Corpora Humana.

(b) Atmospheric air may be considered as the least intimate of the combinations of nitrogene and oxygene; one hundred cubic inches weigh about thirty-one grains, at 55° temperature and 30° atmospheric pressure. *Davy's Chemical Researches.*

The atmosphere being found to contain a larger portion of oxygene upon the tops of mountains* than in the vallies, is by no means in the same proportion, like the Metropolis, enveloped with thick, unwholesome fogs, and where the atmo-

sphere resembling this air, may be produced from materials formed from the different kingdoms of nature.

Animal substances dissolved (in nitric acid) disengage a quantity of gas, precisely the same as the noxious part of the atmosphere; and if we take seventy-three parts of this elastic aeriform fluid, and mix it with twenty-seven of pure vital air, procured from calcined mercury or manganese, we shall form an elastic fluid, in all its properties, similar to atmospheric air.

Oxygene air, in a properly diluted state, (in the proportion of one to eight, and even as far as one to twenty) has been found to be a very natural and diffusive stimulant; it promotes sleep, greatly assists digestion, aids the insensible perspiration, exhilarates the spirits, and relieves difficult respiration. It is found of the highest use in typhus or low nervous fever. Azotic air relieves inflammation, and with hydrogene air has been thought capable of arresting the progress of consumption. Carbonic acid air is considered as a powerful antiseptic.

* Air grows lighter the higher we ascend; this is proved by

sphere is so lowered, or contaminated, the blood decreases in its natural vitality, and all the energies of life are oppressed; hence arises the diminished action of the heart and arteries, with a train of inveterate complaints, generally ushered in by languor and depression of spirits, the usual precursors of morbid irritability and general relaxation.

It must however be acknowledged that London is by no means unhealthily situated; and this was particularly observed by the Romans in their second invasion of Britain, during the reign of Claudius. It is also to be observed, that since the general introduction of burning fossile coal,* neither the sweating sick-

the barometer, in taking the height of mountains by that instrument; for as we rise in height, so the fluid in the tube sinks in due proportion, and is found to fall at the rate of the tenth part of an inch for every ninety feet.

* The inhabitants of London, Francfort, Leige, and other places, where coal is consumed, are in a perpetual fumigation (with ammoniacal gas); this, in a great measure, counteracts

ness, nor the plague have been known, and considering its size and extent, this city is

the pestilential effluvia, continually arising in great cities by destroying its septic acid.

Several large towns in Germany and the Netherlands, where coal is the material article of fuel, have been much less ravaged by contagious diseases of late years than formerly. From the testimony of several intelligent observers, the city of Richmond, in Virginia, may be also taken as an example. The infectious distempers of its inhabitants having greatly lessened since the general introduction of burning pit coal. It has also been satisfactorily proved by the Earl of Dundonald and Mr. Kirwan of Ireland, that ammoniacal gas, or alkaline air is produced by almost every species of mineral coal. Sylvius de la Boe, of Leyden, maintained, that the malignant fever of that place in 1667, derived its source from a prevailing acid. Professor Chaptal, of Montpellier, and many others have affirmed that vapours, exhaling from putrid substances, are highly acid; this has been termed septic acid.

It has also been asserted, upon respectable authority, that alkalies have contributed more than once to arrest the plague and prevent it from spreading at Grand Cairo. The general theory and practice in contagious diseases would induce one to discredit this doctrine; it may undoubtedly appear strange to many, nevertheless I must venture the imputation of credulity, by believing it to be effective, in some contagious cases, though I attempt not here to investigate its *modus operandi*.

one of the healthiest in Europe. On the other hand, when we contemplate the immense number of human beings who inhabit it—that air, once breathed, becomes unfit for future respiration—that the breath of man is more injurious than that of any other animal ; and if we reflect on the prodigious quantities of fuel consumed or combustion, of fires and candles* which load it with smoke, sulphur, and other exhalations, the constant progress of putrefaction from masses of tainted and corrupt substances, from burying-grounds, slaughter-houses, dung-hills, &c. we

* It is estimated that every human creature decomposes, or destroys the vital principle of near a gallon of air each minute that he breathes ; and that a single candle consumes about the same quantity in an equal space of time, and where flame will not burn an animal cannot live. It is from the absence of this gas, or an accumulation of carbonic acid gas supplying its place, that suffocation ensues to those that incautiously enter mines, pits, wells, &c. without the previous examination by the test of flame ; the gravity of carbonic acid gas being greater than common air, often occupies the bottom of deep pits, wells, &c. while the upper part is entirely free from it.

surely cannot wonder at the increase of the azotic principle;* and when we also consider that it is rendered additionally unwholesome by fogs from drains and the river Thames. The lungs necessarily become oppressed, and incapable of conveying but a small share of that vital principle so essentially requisite for the continuance of sound health: hence it is evident that the air of the metropolis† must be much less pure‡ than the country; there mortality is comparatively upon a small scale, as there are but few of the above enumerated causes to render the

* When atmospheric air is completely vitiated by the breathing of animals, or the burning of fuel, we find, in such vitiated air, a much greater quantity of azotic gas, than of the carbonic. *Vide Dr. Black's Lectures on Chemistry.*

† Azote accumulates in all places crowded with human society, and from every species of impurity.

‡ It has been remarked that among the different classes of animals, birds live in the purest air.

atmosphere unwholesome, and where vegetation is perpetually tending to improve it.* Hence the superiority of rural life,† the sphere

* The lungs, by inhaling oxygene gas in respiration, supply the body with the principle of life and heat, it excites a chemical action on the pulmonary blood, by which it acquires a florid colour, and stimulating quality, necessary to keep up the action of the heart, and health of the body.

Whenever animals die from a deficiency of this air, their blood is always found black. When an animal breathes the same air several times the pulse becomes slower, until at length it ceases. Respiration vitiates the air, deprives it of its elasticity, and renders it unfit for inflating the lungs or supporting life. The medium volume of air contained in the lungs of a human being, after a complete expiration, is computed at 109 cubic inches, and this quantity receives an addition of 14 cubic inches at each inspiration.

Respiration is performed much slower than the systole, or contraction of the heart, three or four pulsations taking place to one respiration.

See Dr. Edmund Goodwyn on the Respiration of Animals.

† The growth and vegetation of plants, while exposed to the light of the sun, is among the most powerful means employed by nature for renovating the purity of the atmosphere; but, on the contrary, during the night or in the shade, they

where man was formed to pass his days remote
from crouded cities, and noxious impregnations.

Ye who amid this fev'rish world would wear
A body free of pain, of cares, a mind,
Fly the rank city, shun its turbid air;
Breathe not the chaos of eternal smoke
And volatile corruption, from the dead,
The dying, sick'ning, and the living world
Exhal'd, to sully heaven's transparent dome
With dim mortality.——
—— while yet you breathe, away !
Sweetly thou may'st thy vacant hours possess
In Hampstead, courted by the western wind;
The rural wilds invite;
The woods, the meads, and each ambrosial breeze
That fans the ever undulating sky.

Armstrong.

Although Hampstead is so few miles from

corrupt the common air by exhaling azotic gas. Vegetables absorb water, which becomes decomposed by the influence of light and the action of the sun, and taking hydrogene for their nourishment, breathe out oxygene in great purity. They are highly nourished by water saturated with carbonic acid gas applied to their roots; when this is done, a decomposition takes place, and its carbon forms a constituent part of the vegetable, its oxygene being liberated in a gaseous form. Carbonic acid gas applied as an atmosphere, in the proportion of one eighth, is found to promote their growth, but in a greater proportion, is always injurious.

London, yet its elevation renders the air pure,* and stagnation is prevented by those streams of atmosphere that it so often experiences, from which ever point they blow.† In every climate

* The highlands of every country are the most favourable to longevity, and in such abodes persons of the greatest age are usually found.

† Winds are presumed to be only strong currents of air, occasioned by changes in the specific gravity of the atmosphere, in consequence of variation produced in its temperature by the sun, (heat being endowed with the power of expansion); and their courses regulated on the surface of the earth by the intervention of mountains.

North winds, being usually dry and cold, are esteemed the most salubrious, as they purify the atmosphere; and, by their bracing properties, impart elasticity and vigour to the body.

South winds, blowing from the warmer regions, are often productive of considerable relaxation.

Westerly winds are marked by no characteristic peculiarity, but passing over the Atlantic Ocean, often load the air with vapours, which descend in rain.

Easterly winds are often extremely cold, and, instead of exhilarating, produce very enervating effects, particularly on

and country certain situations are to be found more healthy than others: hence, a situation where air may be enjoyed in its most healthy state, becomes an object of the first importance; and where we have the power of chusing for ourselves, we ought to select one that is elevated and dry; and in the construction of the house, we shall do well to shelter ourselves from the north and east, and to have the aspect of the building to the south.

convalescents and valetudinarians; and are generally acknowledged to be the most pernicious winds that blow.

Winds, passing over a continent, are generally of a dry and healthy nature; those blowing almost directly from the ocean, or over high mountains, become loaded with moisture. Clouds charged with rain, by the action of the solar beam, are impelled by winds to the sides of mountains, and afterwards descend in rain upon the surface of the earth. It is now known that all continents are supplied with chains of mountains near the sea upon their western boundaries, and from this cause, winds, which blow over mountains generally bring rain, and the south-west winds passing over the vast Atlantic Ocean, produce the most frequent storms, and the greatest quantities of rain in this country.

As the atmosphere we breathe is so essential to the support of life, and is constantly exciting such powerful influence on the human frame, by its impregnations, incumbent and circumambient pressure,* dryness and moisture, sudden transitions to the extremes of temperature,† variations of the wind, &c.‡ it behoves us, as

* The surface of the earth is surrounded with a weight of air, equal to thirty-two feet of water, or twenty-nine inches and a half of quicksilver; and if a tube, exhausted of its air, be set with its mouth downwards in water, the water will rise into the empty space, and fill the inverted tube; the external air will, in this case, press upon the water surrounding the tube, and force it up into the vacuum, thirty-two feet, and no higher. It is on this principle that pumps raise water.

† It has sometime since been discovered that the temperature of the human body in health never exceeds ninety-six degrees of Fahrenheit, although the atmosphere, which surrounds it, may be heated to a much greater degree. This with much reason has been attributed to increased perspiration, and consequent evaporation.

‡ Damps and fogs should be counteracted by ventilation and fires.

much as possible, to guard against their injurious consequences. But if it be impossible in a great measure to escape these natural evils, let us at least endeavour to avoid those of an artificial nature.* Nothing is more common than for persons to come out of a severe winterly atmosphere, and directly take their station before a large fire in a heated apartment;† but this practice, although common, is exceedingly hurtful. The human constitution is formed only for

* It is well known to almost every one, that when the fingers or toes, legs, or other parts of the body have been greatly benumbed, so as to be deprived of the genial circulation of the blood for some time, the only prudent mode is to apply snow to the part so benumbed, or immerse the same in the coldest water, in order to diminish the accumulated excitability, and afterwards, by applying gentle friction, to promote the return of warmth, and to restore animation to the part; if the reverse of this practice be applied, (direct heat) almost immediate mortification will ensue. In consequence of these simple and well known means not being resorted to, I have known many cases in which amputation was rendered indispensably necessary.

† If a man come out of a bitter cold, suddenly to the fire, he is ready to swoon, or be overcome. LORD BACON.

gradual changes, but by the above incautious means we are perpetually, in the winter season, passing to extremes of climate.* Nevertheless it is by no means so hazardous to pass from heated to cold air, as vice versâ.† But all sudden variations should be avoided as pernicious in proportion to their extremes.

Countries such as the South of France, some parts of Italy, and others nearly of an equal tem-

* The seasons are always most healthy when they correspond to their usual temperature, and proceed in an uniform progression. When they essentially vary, great sickness usually prevails.

Summer and autumn are fraught with putrid and bilious diseases.—Winter and spring with those of an inflammatory nature.

† It is also known from several familiar facts, that whilst the circulation of the blood continues, the temperature of the body may be raised many degrees above the natural standard, without destroying the principle of life; but it appears, on the other hand, from various experiments made to recover the hybernating animals from their torpor, that

perature, or those nearest in general to about 60 degrees of Fahrenheit, have usually been considered as most favourable to health; but it must be acknowledged that instances are not wanting, (notwithstanding our variable and northerly climate) of some persons attaining in this country, to as great a longevity, as the people of any Island or Continent in the known world.

when the circulation of the blood has ceased, and the temperature of the body is reduced nearly to the freezing point, if heat be applied either suddenly, or in a very high degree, the principle of life is soon destroyed; whereas if it be applied gradually, and in a very low degree to the same animals in the same circumstances, the principle of life is often excited to action, and the functions are soon restored.

NATURE OF THE EARTH NEAR THE SALINE MINERAL SPRINGS.

The nature of the earth, contiguous to the springs, experiments on the clay, and the mineral water, with an enumeration of some of the principal diseases, in which the water may be administered with every expectation of success.

On digging a trench within a small distance from the spring head, underneath the soil was found a bed of stiff clay, intersected with numerous blue veins or lines, resembling the veins of marble. Some of this clay when completely dried, was sufficiently hard to bear polishing.

EXPERIMENTS ON THE CLAY.

EXPERIMENT I.

A strong effervescence, from disengagement of gas, took place on adding the acetous acid. The

same effervescence also took place on adding the diluted sulphuric acid to a small quantity of the above clay.

EXPERIMENT 2.

A hundred grains of the dried clay, reduced to fine powder, were well shaken with thirty times their weight of distilled water of the temperature of 120° Fahrenheit. After standing two hours, the mixture was poured on filtrating paper previously weighed.

The liquid being filtrated, the paper, with the powder remaining upon it, were exsiccated in a heat of about 212° , when the powder was found to weigh ninety-five grains, allowing for waste ; so that we may reckon five grains of saline matter to have been dissolved in the water.

EXPERIMENT 3.

To determine the nature of the substance contained in the clay, which was, as just mentioned,

dissolved by the water; two thousand grains of the clay were boiled in three quarts of distilled water, until only two quarts remained. They were then filtrated; and the filtrated liquor being evaporated to dryness, it afforded nearly ninety-eight grains of residue; which was sulphate of magnesia, with a small proportion of muriate of soda, and sulphate of lime.

On a hundred grains of the insoluble residue left on the filtre was poured four ounces of concentrated muriatic acid, diluted with one pint of distilled water; which mixture was boiled for above an hour, when acid vapours ceased to appear.

After being digested for twenty-four hours the liquid part was then filtered, and the matter on the filtre was elutriated by repeated affusions on boiling distilled water. There remained on the filtre a quantity of undissolved matter, which, being dried, weighed sixty-five grains. It was silicious earth.

The filtrated muriatic solution and waters of

elutriation just mentioned, being evaporated to dryness, weighed sixty grains. This solution, evidently, to the taste, was entirely, or principally muriate of alumina.

Fifty grains of this muriate, being dissolved in three ounces of distilled water, prussiate of potass was added till it ceased to throw down prussiate of iron; which precipitate, being collected and dried, weighed two grains.

The decanted liquor from this precipitate, afforded a very copious precipitation, on pouring into it liquid caustic ammonia, and the sediment was found to be alumine.

To the liquid decanted and filtrated from off this last substance, liquid subcarbonate of potass was added, which occasioned a slight precipitation. The precipitate, being collected and dried, was found, by the test of oxalic acid, to be carbonate of lime, hence, the one hundred grains of clay afforded

Of silica	64 grains.
Alumina	26 by estimation.
Sulphate of magnesia ..	5
Oxide of iron	1 by estimation.

Total 96 grains;

besides a very small proportion of carbonate of lime, and waste.

MORE attention has been paid to the analysis of the clay, on which the springs were found, than may perhaps at first be thought requisite. This was undertaken, not only to satisfy myself, but also from a hope to produce in others, an attention to the analysis of earths and soils; an enquiry into which, if generally prosecuted, must be attended with great and important advantages to the agriculturist, and, consequently, to mankind in general.

EXPERIMENTS ON THE MINERAL WATER.

SIMPLE PROPERTIES.

The mineral water,* when fresh drawn, is clear, but not brilliant; when poured from one glass into another, it sparkles but little; is inodorous; its sapidity, whilst drinking, is hardly more than that of ordinary springs: but almost immediately after, a saline, rather bitter taste is perceived, which remains in the mouth for some minutes.

* Simple water is defined to be a transparent fluid, about eight hundred and thirty times heavier than atmospheric air, without taste, smell, or colour, in a small degree, compressible, liquid in the common temperature of our atmosphere, assuming the solid form at 32 Fahrenheit, and the gaseous at 212; it is not a simple element, as generally supposed, but a compound fluid, composed of two substances, neither of which can be exhibited separately, except in the gaseous form: and, when aeriform, they are known, the one, as hydrogen gas, or inflammable air; the other, as oxygen gas, or vital air. These gases, in the proportion of three of hydrogen to eleven of oxygen, when chemically united and re-

Vegetables, boiled in this water, are rendered more intensely green.

The temperature of the water was found to be 57 of Fahrenheit's thermometer scale, when the circumambient atmosphere was 62°.

duced from the form of an air, to that of a liquid, constitute the fluid called water. It must be understood that water is not considered a compound of two aeriform gases, but only of their basis, or gravitating matter; for light and caloric, which constitute the imponderable parts, escape during their union. Water may be decomposed by a variety of means, and its component parts separated from each other.

Hydrogene gas (*a*) is esteemed eleven times lighter than common air; the proportion of gases by volume required to form water, is nearly two of hydrogene, to one of oxygene.

Water is the most wholesome diluter in nature. It was before observed that the people who breathe the pure air of highland countries, are famed for longevity, as well as strength of mind and body; and it is probable that they are not a little assisted by this simple beverage, which they partake of more than any other. And we are informed, from respectable authority, that a woman, in Rosshire, subsisted almost

(*a*) Hydrogene gas may be procured from dilute sulphuric acid, and iron filings.

SPECIFIC GRAVITY.

A cubic foot of this water, containing one thousand seven hundred and twenty-eight cubic inches, at 55 degrees of Fahrenheit, weighed, one thousand and eight ounces avoirdupois, instead of one thousand, such ounces, being a cubic foot of distilled water; for a wine gallon of the mineral water, containing two hundred and thirty-one cubic inches, weighed one hundred and thirty-four ounces and three quarters; and the same bulk of distilled water, weighed, one hundred and thirty-three ounces and two thirds.

upon water alone for a great length of time, and her complexion remained clear and florid, and some parts of her body, rather fleshy, than spare.

It has been also remarked by a celebrated canal engineer, (a) that men from the northern counties, whose food consisted chiefly of farinacea, milk, and potatoes, and whose drink was chiefly water, were enabled to sustain more fatigue, than such as lived upon the general diet of the labourers of the south.

(a) Brindley.

EXPERIMENTS.

EXPERIMENT 1.

About a quart of water was exposed for an hour in an open vessel, the air being at the temperature of 60° to 65° . some air bubbles were seen adhering to the sides of the vessel.

In nine hours a wheylike turbidness succeeded. After remaining eight days in an open vessel, saline matter was found crystallizing around the edge of the vessel, a slight pellicle was seen on the surface, and an earthy precipitation had taken place.

EXPERIMENT 2.

Tincture of red cabbage dropped into a glass of the water, produced a beautifully green colour, which became, in twelve hours, a yellowish brown.

On adding this tincture to the water

that had been boiled and filtrated, a light green colour was almost instantly produced : in sixteen hours this also changed to a faint yellowish brown.

The red colour of the tincture of cabbage was not altered on adding it to distilled water.

EXPERIMENT 3.

Tincture of litmus, on being added to the water, was rendered rather more deeply blue.

This tincture, reddened by acetous acid, was restored to its blue colour by immersion in the water.

By distilled mineral water the tincture of litmus was not altered.

EXPERIMENT 4.

Paper, stained with tincture of turmeric, underwent no alteration in colour, by the water under examination.

EXPERIMENT 5.

On pouring syrup of violets into the water, it almost immediately became of a pale green colour. The water, which had been boiled fifteen minutes, instantly changed the syrup in like manner, but in a less degree.

EXPERIMENT 6.

Muriate of baryt immediately occasioned thick white clouds; and, on standing, a copious white sediment.

EXPERIMENT 7.

A saturated solution of acetite of lead produced thick white clouds, and an abundant precipitation; which precipitated matter continued equally white after standing for a week.

EXPERIMENT 8.

Lime water occasioned an immediate cloudiness, and the precipitation which ensued on

adding the sulphuric acid, was almost entirely redissolved.

The precipitation, in boiled water, was not less than in the unboiled.

It required double the quantity of lime water to be added, to render the mixture capable of changing turmeric paper from yellow to reddish brown.

EXPERIMENT 9.

Baryt water rendered the mineral water very thick and white, and, in a little time, a copious precipitation ensued. The boiled water produced the same effect. The deposit was partially soluble in acetic acid.

EXPERIMENT 10.

A very slight effervescence ensued on adding the sulphuric, nitric, and muriatic acids.

EXPERIMENT 11.

Nitrate of silver occasioned a white precipitation; and the deposit, on exposure to light for several hours, changed to a bluish grey sediment.

EXPERIMENT 12.

On adding the spirituous solution of soap to the water, it immediately curdled. The boiled water occasioned the same effect.

EXPERIMENT 13.

Caustic potass occasioned a white flocculent precipitation. With the boiled water, there was nearly the same appearance and precipitation.

EXPERIMENT 14.

Caustic ammonia produced a turbid appearance, and a copious white deposit afterwards took place; apparently in as great a quantity as in the preceding experiment.

EXPERIMENT 15.

Oxalic acid produced a white precipitation, but not an abundant one. With the boiled water the same effect ensued.

EXPERIMENT 16.

With fluat and oxalate of ammonia, there was an immediate cloud, and white precipitation. The boiled water occasioned the same effect.

EXPERIMENT 17.

Silver was not tarnished by immersion in the water.

EXPERIMENT 18.

Prussiate of lime hardly caused any change. The experiment being repeated, with a few drops of concentrated muriatic acid, previously added to the water, in a little time after, it became of a clear blue; but no precipitation took place.

EXPERIMENT 19.

A piece of nutgall was suspended by a thread in the centre of a large phial, which phial was sunk about two feet under the surface of the spring. In a few hours, a brownish turbidity took place. In eight days it assumed a colour inclining to black.

EXPERIMENT 20.

Gallic acid, in a few hours, rendered the water turbidly brown. After standing some days it became of a darker brown, with an iridescent pellicle on the surface.

On examining this water frequently with tincture of galls, a rose coloured tint was sometimes produced.

EXPERIMENT 21.

A wine gallon of the water was exposed to the sun's rays, till evaporated to one half; the pre-

cipitation which took place was then collected by the filtre, which, on crystallization, weighed one hundred and seventy-one grains, and was chiefly sulphate of magnesia.

The evaporation was afterwards continued in the same manner to dryness, whilst the thermometer was 70° in the shade; and a saline residuum remained, which, on crystallizing at about 120° , weighed three hundred and sixty grains.

The total sediment was therefore, by this evaporation, five hundred and thirty-one grains; or rather better than sixty-six grains per pint.

The three hundred and sixty grains of sediment, just mentioned, was found to contain

Sulphate of lime	36 grains.
Sulphate of soda	15
Muriate of soda	13
Sulphate of magneisa	291
Carbonate of lime	5—360
Crystallization of Sulphate of magnesia	171
<hr/>	
Total	531

EXPERIMENT 23.

By boiling a wine gallon of the water fifteen minutes, it afforded a little more than six ounces measure of air, which, on examination, was found to consist of

1st. Carbonic acid gas, two drachms measure, according to the test of caustic potass.

2d. Oxygene gas, three ounces measure, according to the test of nitrous gas.

3d. Nitrogene gas, nearly three ounces measure ;

hence a wax taper burnt, in this mixture of gases, after abstracting the carbonic acid gas, with a brighter flame, and for a longer time than in an equal volume of atmospherical air.

From the preceding experiments, it appears that this mineral water contains in each wine gallon,

- 1st. Of substance left on evaporation, and indicated by reagents 531 grains.
 2d. Of gases 6 ounces in measure

The substances consist of

Sulphate of lime	36 grains.
Sulphate of soda	15
Muriate of soda	13
Sulphate of Magnesia	291
Carbonate of lime	5—360
Deposit of sulphate of magnesia	171

Total 531

CONCLUSIONS.

1st. The simple properties, such as its bitterish taste, laxative effect, and its effect on boiling vegetables, evidently shew that the water possesses mineralsaline ingredients.

2d. The specific gravity also indicates a considerable impregnation.

3d. Experiments 1, 2, 3, 4, and 5, shew the absence of acid in a free state; while, on the contrary, (espeeially the 5th) they indicate an alkaline substance, but so slightly, that the indication is rather to be referred to an earthy salt; as such alkali, would be incompatible with the nature of the water, in experiment 12.

4th. The presence of sulphuric acid, in a combined state, is indicated by experiment 6, 7, and also by the 9th.

5th. Experiment 8, and 9, rather shew the

existence of magnesia or alumina, than of carbonic acid; because of the copiousness of the precipitation, which, if from carbonic acid the water would have an acidulous taste, and accordingly alter vegetable colours.

6th. Muriatic acid, in a combined state, is detected by experiment 11, but not in abundance.

7th. Experiment 13 manifests an earth, which is probably not the calcareous; because of the the slight precipitation in experiments 15 and 16.

Experiment 14 shews, that this earth is either magnesia or alumina.

8th. Experiments 15 and 16, indicate a small proportion of lime.

9th. Experiment 17, declares the absence of sulphur, as do the simple properties of the water.

10th. Experiments 18, 19, 20, scarcely afford traces of the presence of iron.

The reagents employed confirm the accounts of the products found on evaporation; but do not indicate any other different substances: hence this mineral water must be considered as impregnated chiefly with an intimate chemical combination of neutral saline matter; and, besides the advantages of such a combination, are those arising from the other ingredients.

I must beg leave to be understood, that although Analysis is certainly useful, as it acquaints us with the principal integral parts, yet I by no means presume upon it; as most waters are continually undergoing certain changes, according to different states of the atmosphere;* and, after all, it must be confessed that experience of the

* And this is also generally observed to be the case with all the waters of Spa in Germany, that they are frequently chang-

effects of mineral waters upon the constitution is superior to any analysis ; and even in the present improved state of chemistry, analysis is by no means wholly unobjectionable ; Venci and Cornette have evidenced, by experiments, that long continued ebullition often decompose saline matters dissolved in water.

Mr. Kirwan has informed us, that tests are allowed to afford conjectural, not demonstrative inferences. Fourcroy, has also acknowledged their insufficiency, but assures us that evaporation conveys an exact account. This, however, appears to be contradicted by himself.

“ The fallacies to which evaporation give rise have been noticed by Mr. Fourcroy, ever since the

ing in what is called their goodness and strength. *Ash on the waters of Spa and Aix la Chapelle.*

About three months since, I detected Hepatic gas in the Barnet water, but I find it is not uniformly impregnated with it.

year 1788, and some of them he has indeed, happily obviated. Thus he has shewn that when hepatized waters are evaporated to dryness, the sulphur reacts on the aerated lime contained very frequently in those waters, and converts it into an hepar, and when spirit of wine is afterwards applied, the hepar is dissolved by it, and consequently the aerated lime can at no period of the analysis be discovered. But when the spirit of wine that contains this hepar is again evaporated to dryness, the sulphur is converted partly into sulphuric, and partly into sulphureous acid, and thus a selenite is formed, and if the water contained muriated magnesia, Epsom salt will also be formed, and thus the original ingredients are completely metamorphosed and disguised, *Analyse de l'Eau d'Enghien*, p. 270, and 325.

In addition to this observation, grounded on experiments, which he purposely instituted to verify them, I shall further remark, that mineral waters frequently contain incompatible salts as

already stated, one or other of which is indeed in an inconsiderable proportion, but when, by close evaporation, they are brought together, in an inconsiderable space, they decompose each other, and thus salts are exhibited which the water did not originally contain.

Again, the usual practice is to weigh the saline mass left after evaporation, before and after treating it with spirit of wine, in order to judge by the loss of weight, how much of it had been taken up by the spirit. See 1 *Bergm.* p. 181. 5 *Fourcroy*, p. 127. and 1 *Westrumb.* 2 *heft.* p. 119, and 120. Now it is easily seen that the difference of weights can decide nothing in this case, unless the degree of desiccation before and after the treatment with spirit of wine be exactly the same, which can never be expected to happen; not only because the same degree of heat cannot be exactly attained, nor the saline mass exposed under exactly the same surface; but also, because the salts that remain after the action of the spirit of

wine, retain water much less powerfully than those which the saline mass contained before it was exposed to that menstruum. Nor can this inconvenience be remedied, by weighing the contents of the spirituous menstruum after its evaporation ; for these will be often found to weigh more than the spirit had really taken up, because it deposits its contents in a crystallized state ; which nevertheless it had taken up deprived of their water of crystallization : and this is particularly observable where muriated magnesia is concerned, as Fourcroy has well remarked, *Analyse d'Enghien*, p. 284.

The various losses of weight above mentioned have also been noticed by him, *ibid.* 282, and by Westrum. 2. *Westr.* 2 heft p. 43, and cannot have escaped any experimenter.

The process that next succeeded the treatment with spirit of wine, namely, the solution of

the more soluble salts, by adding to the dry residuum eight times its weight of cold water, and separating them from each other by crystallization as recommended, 1 Bergm. p. 122, and 126, is still more grossly defective and incapable of answering the end proposed in a great variety of cases, not only from the inverted order of solubility, when the least soluble are also in the least quantity ; but also from the avowed impossibility of an exact separation of many species of salts by this method. Thus, it is well known that common salt and soda, common salt and glauber, common salt and Epsom, glauber and soda, glauber and Epsom, muriated lime, and muriated magnesia, nay, not even nitre and common salt, can be exactly separated by crystallization ; and hence in all these cases, the most skilful, and experienced Analysts have, of late, been necessitated to have recourse to estimate their quantities by calculation. *Kirwan on Mineral Waters.*

The diseases in which I have experienced these saline waters to be most decidedly beneficial, have been cases of dyspepsia or indigestion, under which head may be comprized want of appetite, nausea, vomiting, flatulent eructations, heartburn, constipation, pain and oppression in the stomach, with other symptoms of derangement in the digestive functions.

In *hepatitis*,* *icterus*, and *cholera*, and in all affections of the liver, and biliary organs, whether arising from inflammation, interrupted excretion, or redundant secretion of bile.

In incipient cases of anasarca, and ascites (dropsies) these waters, by producing an incite-

* Medicines promoting alvine evacuations are highly expedient for this purpose, and those which are of a saline nature appear to me to claim a preference; and perhaps it is adding not a little to their efficacy to exhibit them in a diluted form.

Saunders on the Structure, Economy, and Diseases of the Liver.

ment of the different secretions, have also often done good; but they ought not alone to be depended upon; with auxiliary remedies they may be drank with complete success.

In hemorrhoids (piles), affections generally occasioned by plethora, habitual costiveness, or aloetic purgatives, these waters, by their unirritating effects, and by preventing an accumulation of indurated alimentary fæces, and by obviating plethora, have been found to be not only an efficacious remedy, but a certain preventive.

In gouty habits, and constitutions which have been impaired by a sedentary life, high living, intemperance, or hot climates; diseases incident to females, worms, and various anomalous complaints; in some kind of eruptions, and in all glandular and visceral obstructions, these waters, by their attenuating and deterging qualities, pervade every part of the system, and bid fair to prove efficacious remedies.

These waters usually act either as a gentle purgative*, diuretic, or diaphoretic, and some-

* Two pints of the water, boiled with one of milk, separates into curd and whey; the whey is an excellent laxative drink. Mixed occasionally with the waters of the Well Walk, I have found them efficacious in many disorders.

Persisting in my researches here, I have lately discovered more springs than one impregnated with sulphurated hydrogen gas, in their nature nearly between the mineral waters of Moffat and St. Bernard's Well, North Britain; and when mixed with the saline and chalybeate, will, I believe, be found efficacious in scrophulous affections: in this opinion, several of my medical friends coincide. At present I have not had sufficient experience of them, to offer the Analysis; but purpose it at some future period.

In all cases, where purging is indicated, the saline mineral waters will be found to fulfil this intention; and in many cases, the best medicines that can be administered.

Buchan's Domestic Medicine.

It may not be superfluous to observe, that although mineral waters very frequently produce surprizing cures, yet their good effects are not often evident at first; and as the above recited diseases are, for the most part, chronic, the waters require to be persisted in, for some time, yet with occasional intermissions.

times the whole three are answered at the same time; in most cases they should be drank warm.

I have just now quoted Dr. Buchan, because I consider him as a regular physician, one who possesses an intimate acquaintance with anatomy, physiology, pathology, therapeutics, &c. &c. yet, although I have a respect for his abilities, and think his book an able work, I have a different opinion of its tendency.

Physicians, professors, and all regular practitioners of the first abilities, when afflicted with sickness, judiciously call in the aid of their brethren. Yet by far the greater part of persons who peruse such a book, without any previous medical knowledge, consider themselves as proficient in physic, and qualified to prescribe either for themselves or others; and in consequence of this common dabbling, great harm has arisen to society from active medicines being

unskilfully exhibited by numerous persons incompetent to the correct discrimination of symptoms, and the general management of disease; and patients of strong imaginations are continually apt to conceive that they find their own complaints in almost every page. This assertion experience has fully confirmed, and its truth is daily recognised by medical men. Since such writings have been disseminated, with unparalleled assiduity, among the people, how greatly are nervous diseases multiplied ! and from the same source it is that an almost universal system of empiricism prevails. London, and all the large towns of England, are infested with a horde of mercenary quacks, notwithstanding the efforts of government to repress them; and emporiums of venality abound in every street, where gouty elixirs, and tinctures, solar tinctures, lunar tinctures, Persian drops, Oriental cordials, golden pills, &c. are vended as infallible specifics in every disease.

Most of these preparations being, of a stimu-

lant nature,* a temporary mitigation of pain is often obtained, (though at the dangerous risk of sapping the very foundation of the human stamina,) and the same means of relief are again naturally resorted to. The stomach, accustomed to these heating cordials, can scarcely bear any thing else. Thus the worst species of drinking insidiously becomes a confirmed habit, and these medicines are rendered indispensably necessary, (as the poor deluded patient declares nothing else gives relief) until atrophy, spasm, or dropsy, comes up in the rear and closes the scene.

Even the best of these medicines, such as James's powders, analeptic pills, &c. seem to be counterfeited, if we may judge from the printed accusations of the proprietors against one another; one of which handbills I met with lately informing us, "that the very considerable sale of their opponents medicines have occasioned

* An empiric in one of the large towns in the north west of England, has realized *immense property*, by one of these preparations, consisting of rum, opium, and treacle.

that disgraceful practice, the preparing and vending of counterfeits, which, for some years, has been but too prevalent, and is at length become a regular system of trade in the hands of that class of the dealers in medicines, who, regardless of every dictate of conscience, are in the constant habit of selling one preparation for another; and can unrelentingly sacrifice the health and lives of their fellow-creatures on the altar of private emolument." It is well for these people* that vaccination has become general, or I am persuaded, that at no very remote period, but few victims would be found for their rapacity.

Were persons, instead of irrationally tampering with their complaints, to act in every attack

* I am much inclined to believe the proprietors of even the best patent medicines never themselves take their own preparations; I attended two of the most famous in London, one of them for many years (a humane and respectable character) who told me repeatedly in my attendance upon her, that she had never during her life (then about 60 years) taken one of her own pills.

of disease, as advised, in the incipient stage of fever, by the intelligent Armstrong, (a man as capable of judicious thinking as any in the present day, and whose general rules of advice, if more attended to, would greatly contribute to the preservation of their health,) many a valuable life would be rescued from the grave.

But should the public bane
 Infect you ; or some trespass of your own,
 Or flaw of nature, hint mortality ;
 Soon as a not unpleasing horror glides
 Along the spine, through all your torpid limbs ;
 When first the head throbs, or the stomach feels
 A sickly load, a weary pain the loins,
 Be Celsus called ; the fates come rushing on ;
 The rapid fates admit of no delay.

Art of preserving Health.

Being aware that the mind is often enfeebled, and rendered credulous by the indisposition of the bodily powers, (and as I have attempted in other places in this tract to guard the invalid against indiscriminately drinking mineral waters, injudicious bathing, &c. I thought it not inap-

plicable here to warn him against trifling with his health, and I have endeavoured also to secure him from the knavery of impostors. What I have said has arisen from conviction, though I have not the most distant idea, that any thing I can say upon this subject will tend to arrest the general infatuation of the multitude. But if I can only induce a very few persons coolly to think for themselves, and listen to plain unsophisticated reason and common sense, so that they may have the chance of being saved to their families, I shall not have noticed this subject in vain.

BATHING.

On the various kinds of Bathing which may often be made use of, with increased effect, during the time of drinking Mineral Waters.

BATHING is certainly one of the most potent, general, and durable remedies we are acquainted with; but as this powerful agent is so frequently misapplied, to the ruin of the health of numbers, it may not be amiss, in this place, to mention those cases that render it necessary.

The cold bath (or bathing in the sea) is likely to be attended with success in all cases of general debility, accompanied with a feeble circulation, listlessness, great fatigue on moderate exertion, profuse perspirations, and in most of those symptoms known by the appellation of nervous, unattended with visceral disease, or any obstinate obstructions. After coming out of the water, when a general glow almost

immediately succeeds, (which is the re-action of the system,) attended with increased spirits, and chearfulness of mind, the bath in a salutary manner, excites the nervous energy, promotes the different secretions, increases the animal temperature, and strengthens the whole frame. But whenever the shock of immersion is felt very severely, and the person continues pale, languid, and the body shrunk, accompanied with chilliness and cold, want of appetite, or head ache, we are sure that no proper re-action has taken place; and if these symptoms continue, after two or three trials, the cold bath ought no longer to be persisted in.

The time of continuance should be very short, as the effect depends almost entirely on the sudden impression of the cold, which if allowed to continue too long, instead of producing the re-action of the system, and an increased vigour, has, almost invariably, an opposite tendency. One dip is sufficient and should be instan-

taneous ; and the energy of the system will be more effectually roused by one plunge than more, as repetition tends rather to diminish than increase the first impression, but if the bather, through timidity cannot bear the shock of a sudden plunge, the head should first be wetted. After bathing in the sea, persons need not be solicitous about drying themselves, as they will not take cold ; but on returning from a fresh water bath, the body should be immediately wiped as dry as possible to assist the necessary glow. Every impediment to salutary action should be previously removed by a dose or two of purgative medicine, or sea water, in order to cleanse the (*primæ viæ*) first passages. The most proper time to make use of the cold bath is in the morning, fasting, but it may be used two or three hours after a spare breakfast. Moderate exercise ought to precede the cold bath, for neither complete rest, nor violent exercise is proper immediately antecedent to this remedy. After bathing, gentle exercise should again be

taken in order to continue the necessary glow ; but fatigue should be carefully avoided. Bathing on alternate mornings is sufficiently frequent.

The bowels ought also to be kept gently open during the whole time of bathing ; but neither sea water, nor any other purgative, should be administered on the days of using the cold bath.

After bathing for two or three weeks, an intermission of several days should take place ; three or four weeks bathing more may be allowed, which is sufficient, and should not be much exceeded in any season, for plunging in the water perpetually, only tends to weaken the system. In many cases, three or four weeks bathing will be attended with very good effect, as a strengthening remedy.* The cold bath is

* Occasional cold bathing is very salutary even in a state of health where no plethora forbids, and the bowels are in a proper state ; it cleanses the skin of impurities, renders the cutaneous vessels more pervious for a due perspiration,

improper during the time of pregnancy, or any periodical discharges.

The action of water not only produces powerful effects upon the surface, but also on the interior parts of the body ; and while the re-action continues, the mechanical impulse of the water, no doubt, increases the tone and spring of the muscular fibre ; but when abused by continuing too long in the water, or by too frequent application, its effects, with much propriety, have been compared to those which arise from excessive labour, or any other debilitating cause.

From indiscriminate bathing, and the above-mentioned abuse, it is not uncommon for some persons in full health to be seized with apoplexy ; others to become pallid, languid, and to be at-

strengthens the system, and greatly contributes to general comfort.

“ Even from the body’s purity
The mind receives a secret sympathetic aid.”

tacked with fevers, which frequently end in insanity or death.*

SHOWER BATH.

This is an excellent mode of bathing where persons cannot bear a heavy volume of water, and in this way they are less liable to be seized with cramp, an incident, by no means, unfrequent after complete immersion in cold water; and though the shower bath does not cover the body so universally, this circumstance is not in the least objectionable, as the impression is communicated

* Reflecting seriously upon the thoughtless manner in which sea bathing is generally made use of by the votaries of fashion, I am induced to believe that more mischief than good arises from the practice. Many maladies that are found to prevail even months after (were they accurately traced to their remote and true cause) would, I am persuaded, be found to arise from injudicious sea bathing. Indeed a great part of the modes of the fashionable world appears not to be in favour of longevity, causing infirm health, and rapid decay, notwithstanding the confessedly improved science of treating diseases.

as effectually by sympathy* as if the whole body was immersed, and the sudden contact of the water may be modified according to the sensations or wishes of the bather, and by the superior parts of the body receiving the first impressions, the blood is impelled to the lower parts, and all the inconveniences arising from the common manner avoided.

Persons that are extremely delicate and timid may use this bath at first of a tepid warmth, and after being accustomed to it, a few times, they will, probably, use it with pleasure quite cold. Where taking cold after bathing is apprehended, a handful or two of salt may be put

* The sympathy that exists between the skin and some of the internal parts, is manifest in many instances. A draught of cold water has been frequently known to relieve a dry burning skin, by inducing a copious perspiration; and Dr. Currie has observed that a bladder full of hot water, applied to the pit of the stomach, is one of the best remedies to remove the shivering and numbness of limbs, arising from exposure to cold and wet.

into the water. If any one should wish this or any other bath, to be as strongly impregnated as sea water, about four ounces of muriate of soda (common salt) may be put into each gallon of water.

Sea water, in different parts of the ocean, and taken up many fathoms under the surface, differs much in its strength, and somewhat in its composition ; but on the British shores, it is not more than in the proportion of four ounces and a quarter of saline contents to a gallon of water.

The following is nearly about the average of its component parts, as I have usually found it, in evaporating different quantities by way of experiment, when stationed near the coast.

Muriate of soda 3 parts.

Muriate of magnesia 1

Sulphate of lime $\frac{1}{30}$ part.*

* Those who choose to make use of artificial sea bathing, may saturate fresh water with common salt, or

A sort of cold bathing has been much introduced into practice by Dr. Currie, of Liverpool, with great success, in various fevers, and some of them of the very worst kind. It is known by the term cold effusion, and is done by dashing cold water over the body, particularly in typhus, (nervous fever), typhus putrida, (malignant fever), in incipient cases of scarlatina, and in that dreadful scourge, which spread universal terror over the West Indies and America, typhus icterodes,* or yellow fever.

1st. Common salt 3 parts.

2d. Epsom salt 1 part.

The last may be wholly omitted.

Where resorting to the sea is inconvenient the purpose may be as completely answered at home, (except in some scrophulous cases), by the shower and slipper bath, which can be impregnated with saline contents equally strong as the sea, and answer the intention either as a warm or cold sea bath.

Dr. M. Adair, in his medical cautions, has assured us, that sea bathing derives its efficacy more from the coldness, than the saltness of the water; and as fresh water is colder than salt, it deserves the preference.

* Dr. M'Lean mentions that he has used the cold effusion

THE WARM BATH.

It is experimentally found that the skin receives a sensation of warmth, when in contact

with advantage in many instances, at an early period of the disease, where there has been much diminution of nervous energy ; and that to heighten its effects, he has premised the warm bath, and while the patient was sitting on it, he dashed two or three buckets of cold water suddenly on him.

Dr. Kinglake, of Tauriton, informs us that he has treated podagral (gouty) inflammation, and irritation attacking the Ligamentous and Tendinous structure, from whatever cause arising, with uncommon success, by the refrigerant application of water. (a) *See Medical and Physical Journal for 1801—3, or Dr. Kinglake's Dissertation on Gout.*

(a) There can be no doubt, but that much more is to be done for the relief of gouty persons, than is generally believed : that disease, until lately, having been deemed the opprobrium medicorum ; and in consequence, the investigation of its nature much neglected, and the disease itself generally consigned to patience and warmth ; but nothing can be more fallacious than the idea that has almost universally prevailed, that paroxysms of gout are salutary to the constitution.

The rationale of Dr. Kinglake's theory appears strong, but in his ardour to assist mankind, has he not been rather too adventurous ?

with water a few degrees lower than the animal temperature, which is usually, in a healthy state, at about 96 to 98 Fahrenheit;* but we may commence the warm bath, in general, at about 92 or 94; in a few minutes the temperature may be gradually raised to 98, but, in most cases, it will not be advisable to proceed beyond this degree of heat.

The increase of its temperature should always be determined by the thermometer, as the sensation

I have myself, cured the most chronic head aches, by first ordering the head to be shaved, and afterwards dipped in cold water every morning; even after blistering, leeches, cupping, electricity, and many other means had been resorted to ineffectually.

Ice, or the coldest water, has been strongly recommended in burns, as an instant application by Sir James Earle, and other eminent practitioners.

* The temperature of the human body, in a healthy state, is usually from 96 to 98 degrees, and is ascertained by inserting the bulb of a thermometer under the tongue, with the mouth shut, this will be nearly the same as if the instrument was introduced into any part of the body, by an incision purposely made.

of the person immersed is very fallacious and hazardous, on account of the slow and gradual addition of the heat, that causes him to be insensible of its augmentation.

The time of continuing the bath should at first be short. This may each time be gradually extended until fifteen minutes are fully expired, or, if the constitution be strong, to twenty. In general this ought not to be exceeded.

It has been found that a smaller degree of heat continued for a sufficient length, will cause as great a degree of relaxation as a higher temperature continued for a short time, and without being attended with the inconveniences often arising from an higher. If perspiration be required, the patient should immediately go to bed, and frequently sip tepid drinks.

In cases of considerable debility, where it may be thought necessary to use the warm bath, the

person immersed may take a cupfull of warm wine and water, or a little egg wine, in order to enable him to support the bath with less fatigue.

The warm bath has a peculiar tendency to relieve local irritation, and bring on a state of repose, by inducing sleep, and it is an excellent remedy in weak and irritable constitutions, which often have not power to withstand the shock of cold bathing. It is also well calculated to relieve complaints that depend much on an irregular, or diminished action of any part of the alimentary canal, as it is found to be highly favourable to the healthy action of the stomach and bowels.

Warm bathing is also of much advantage to persons who labour under complaints, arising from a deficiency of perspiration, and which often produce herpetic and other troublesome eruptions, on the surface of the body. These are greatly relieved by the use of the warm bath, which relaxes the emunctories of the skin, rendering

them more pervious, and thereby disposing them to receive any necessary external application.

Tepid baths, from 92 to 95°, are of considerable service in all cases of over exertion or fatigue, either of body or mind. At these degrees, bathing has a cooling and strengthening effect, and greatly assists in reducing the febrile pulse to its natural standard; and the skin, in particular, is preserved in so delicate and pleasant a state, that it cannot fail to communicate an agreeableness of feeling, and a general encreased animation over the whole frame. To render its effects more complete, almond oil, or some soft unguent, should be extended over the whole surface, and this, again, succeeded by gentle friction.

The warm bath, as well as the cold, is often employed as a topical remedy, and in hardly any way, are its effects more obvious than when applied in the form of pediluvia (immersing the feet in warm water) or in medicated fomentations.

by these means the head is often relieved, quiet rest obtained, and the irritation of general fever much allayed. Pediluvium, although a very partial application, greatly assists in promoting an universal and gentle determination to the surface.

WARM SEA BATHS,

Within these few years, have become very fashionable remedies, and are found to be efficacious in a variety of diseases; which is not to be wondered at, when we consider the stimulant property of salt, combined with water; and the additional sensibility which must, of course, be produced upon the surface of the body, when warmth and fluidity are conjoined. But some diseases, for which the warm baths are applicable, are not generally well known, by their property of encreasing the power, or inducing a new action in the absorbent vessels, they have been found to be attended with great success in a morbid diffusion of fluid, in the cellular membrane or cavities of the body; such as œdematous swellings,

and incipient dropsies, also in eruptions of every kind, in stiffness and contractions of the joints, from whatever cause arising, in scrophula,*

* Sea bathing and drinking sea water, was first recommended to public attention by Dr. Russell, in this obstinate disease, which is a peculiar affection of the lymphatic glands. Of late years, the good arising from sea bathing has been greatly doubted by some practitioners of eminence. Thus Dr. Cullen observes, " Sea water has been especially recommended and employed, but after numerous trials, I cannot yet discover its superior efficacy ;" other practitioners of great respectability, who have resided upon the coast, have also denied that sea water, and sea air, are specifics in this disease, because the inhabitants of sea-port towns are not exempt from its ravages ; and it has been remarked to be even more severe among the inhabitants at Lynne, than in the inland towns ; to which they add, that sea water, when applied to the surface of the body, has no other virtues than as a tonic ; they, however, acknowledge to have seen instances of tumours about the neck, in young persons, diminished by the use of the warm sea-water bath. In such cases, the chief seat of the complaint being in the lymphatic glands, and as the mesentery, and other internal parts, generally partake of the disease ; the warm sea bath, by encreasing the power of absorption is requisite, and ought to be used before the cold bath.

Dr. Russell, who is known to have been the father of this practice, gave various alterative preparations, such as mer-

and in spasmodic and convulsive diseases in chlorosis, jaundice, and obstructions in the biliary vessels from calculi, or inspissated bile, and in rickets, and other diseases of children.

Tepid sea-water baths, from 93 to 96 Fahrenheit, act as a sedative in allaying irritability in the nervous system, without inducing weakness or debility.

cury, antimony, sulphur, &c. and sometimes used the warm bath, and applied warm fomentations of salt water to the swelled glands.

When, by the above means, he had nearly dispersed the tumour, he directed sea bathing as a general tonic; and as this disease is well known to take place chiefly in flaccid, relaxed habits; resorting to the sea coast, is certainly not improper. And whatever may be said by some practitioners, whose testimony I am far from doubting, yet I did not find the scrophula so prevalent in the Isle of White, at Plymouth, Portsmouth, Southampton, and other towns on the coast, as at Nottingham, Birmingham, and Manchester; nor did I find it so common at Edinburgh as in London.

Mineral Waters, particularly those of the sulphureous kind, are highly recommended in this disease.

Recourse should be had to the warm or tepid bath, three or four times in almost all cases, before bathing in the sea. It deterges the cutaneous glands, purifies the skin, resolves collections in the cavities of the body, and secures, in a great measure, the benefit of cold bathing.*

Warm sea bathing is also serviceable in many cases where cold bathing cannot be used, and is, upon the whole, a much safer remedy ; and the usual effect of the warm sea bath, immediately on coming out, is feeling light and chearful, without any increase of animal heat, or quickness of the pulse.

The evening is the most preferable time, for using the warm sea bath.

* The best cures done by the cold bath are observed to have been performed by the temperate use of the hot baths first, and for one obvious reason, viz. that hot baths, by external use dissolve the impacted humours, and thus the cold bath succeeding, braces the solids. *Dr. Rutt, on Mineral Waters.*

VAPOUR BATH.

Water applied in the form of vapour or steam,* possesses great power by its actual temperature, and is known to involve a large quantity of combined caloric, while condensing; hence it may be made to apply the stimulus of heat very intensely to the surface of the body, and, by uniting moisture with heat, produces considerable relaxa-

* A Mr. Smith of Brighton, has invented a machine, called the air-pump vapour bath, which has been applied very successfully by Dr. Blegborough, in cases of local disease, and other affections. It is founded unquestionably upon rational principles, and is used by placing either the arm or leg in a copper vessel, tinned inside; after properly securing the limb, the atmospheric pressure is removed by an exhauster, and vapour powerfully conveyed to the part affected, by means of a boiler, containing fluids heated by a spirit lamp. A machine upon the same principle, sufficiently large to contain every part of the body up to the neck, must certainly be an efficacious means to induce an almost immediate general perspiration.

After warm, or vapour bathing, perfumed ointment may be used, merely as a pleasant softener of the skin; at other times, it may be impregnated as a rubefacient, to stimulate the surface.

tion of the extreme vessels. Consequently, it is a valuable remedial process, either in partial inflammation or general fever, and undoubtedly deserves greater attention than it has hitherto experienced.

This remedy has long been employed among the Indians in America, and is much valued on the Continent: the Russians, in particular, use it almost on all occasions, both in health and disease; and generally finish the operation by plunging into cold water, or rolling in snow, a custom rather too bold to be recommended to the inhabitants of this Island.

An account is given us, by an European, of the application of the vapour bath* among the Turks at Cairo. He relates that the person is exposed in a gradual manner to the effects of the bath, until a gentle moisture is diffused over the whole body. Friction is then made use of by an assistant, to

* Steam, at the heat of boiling water, is, nearly four times rarer than atmospheric air, and possesses about the same elasticity.

cleanse the surface, this is carried on until it renders every part exceedingly smooth, when unction is applied to a certain degree, and afterwards washed off; the person is then wrapped in warm linen, and conducted to bed in a cooler apartment.

Some degree of friction is again applied to the skin, until it is perfectly dry : when this is done, the operation is finished.

The person who relates this oriental mode of conducting the bath, describes his feelings, after the operation, in terms of rapture. He was perfectly regenerated, and experienced universal comfort; the blood circulated with freedom, and he felt as if disengaged from an enormous weight, together with a suppleness and lightness to which he had been before a stranger, a lively sentiment of existence diffused itself, to the very extremities of the body, whilst it was lost in delicate sensations; and the soul, sympathizing with the delight, enjoyed the most

agreeable ideas. The imagination, wandering over the universe, which it embellished, saw on every side the most enchanting picture, every where the image of happiness. If life (adds the writer) be nothing but the succession of our ideas, the rapidity with which they then occur to the memory; the vigour with which the mind runs over the extended chain, would induce a belief, that, in the two hours of that delicious calm, that succeeds the bath, one has lived many delightful years.

AIR BATH.

Exposing the body naked, almost instantaneously, to cold air constitutes this bath, and is proper in those cases where the cold bath is likely to be attended with success: where persons, from great weakness and timidity, have an insuperable aversion to a general cold ablution; this may be substituted, and will generally be found both agreeable and refreshing. This fluid, however, as a bracer, is not equal to bathing in cold water; but

its powers in allaying irritation, and inducing sleep, are very considerable, and was much recommended to public notice, by the late ingenious Dr. Franklin, for the relief of those who awake in the night, oppressed with heated and confined air, and who are unable to regain their sleep, from an accumulation of the azotic principle. In this case the application of a cold medium, such as air, which possesses the power of conducting heat, is very comfortable and salutary : but as air, when at rest, is a bad conductor,* the door of the room should be opened, and the person move about to admit a free circulation around the body.

To supersede the necessity of this night bathing, I would advise persons of every description to

* Air in motion, though precisely of the same temperature as when still, will carry off most heat from the body in a given time ; because the portion of air in immediate contact with the body, does not remain long enough near it, to be warmed to a degree that can much lessen its conducting power: *Rigby, on Animal Heat.*

render their chambers as spacious as possible, by excluding all unnecessary furniture ; and, in hot weather, to lay with their bed curtains undrawn, to ventilate the chamber in the day, by throwing the windows and door open, and to expose the bed, in dry weather, to the influence of the atmosphere.

In small confined rooms, where several persons, from necessity, are obliged to sleep together, three or four inches of the upper sash of the window, furthest from the beds, may be left open during the night. Exposure to fresh air is by no means so unwholesome as some may conceive ; and when we observe the peasantry of the country, who are by their exposure to the atmosphere, comparatively in an air bath three fourths of their time, and are much less subject to disease, weakness, or sleeplessness than any part of the community, we must surely be convinced of its utility, as a wholesome medium. I am and ever have been a strong advocate for fresh air in disease, and

have seen such good effects arise from its judicious admission, particularly in fevers, that I am persuaded it has often had more effect in preventing delirium, than any part of the *materia medica*, at the time prescribed; in a state of convalescence, its renovating effects cannot have escaped the most careless observer. Sound health can continue but a short time without a constant supply of good air; how much more then must it be requisite for the poor oppressed patient, labouring under disease!

I have been in part led into this digression, from seeing many reduced to a state of delirium, and others nearly suffocated through prejudices against the proper admission of fresh air, and reflecting that almost half the life of some human beings are spent in their beds. Early hours, light suppers, airy bed-chambers, exercise or labour out of doors during the day, continued to moderate fatigue, are essentials usually attended with sound sleep, good health, and long life. When persons have been exceedingly restless in fevers, and a delirium ex-

pected to come on, I have often observed them to be very sensibly soothed and refreshed by being moved into a cool bed, with fresh bed cloaths, in a different chamber.

FRICTION

Is an important assistant to bathing, and is often made use of, while persons are in the warm bath ; and also, after returning from both warm and cold bathing ; but independently it possesses in itself great efficacy, by deterging the skin ; it likewise promotes perspiration and absorption, attenuates and resolves obstructions, and by exciting a more general and powerful action, encreases the warmth of the body, and strengthens the whole system.

To the sedentary, and in cold indolent temperaments, disposed to chronic rheumatism and paralytic affections, it will be found of infinite utility.

In local disease, its influence on the small series of vessels, (which are often the seat of complaints) is extensively useful. It may be applied to the whole body ; but the spine, abdomen, and extremities are the parts chiefly subjected to its operation, which may be performed in the usual manner ; but if it is done only upwards, in the direction of the absorbent, it will be more effectual ; as these vessels in the extremities, lie superficially, their contents, by this means of procedure, are more forcibly propelled, than can be done in the old manner of moving in contrary directions.

The spine, however, may be rubbed downwards in the direction of the larger nerves. The abdomen or belly, circularly, being most favourable to the natural action of the bowels.

The best time for this useful kind of exercise is in the morning, which ought to occupy some minutes.

The strength and health that children derive from gentle friction is incalculable. A flesh brush, a piece of flannel, or the naked hand, may be used for this salutary operation. The first two are most suitable in health, the last, in disease.

I ardently wish to recommend a more general use of friction and vapour bathing, from experimental conviction of their powers on others, as well as myself, in removing obstinate and local disease.

But the most salutary and complete operation of this kind, which includes extending the joints, and other parts of the body, is that of champooing,* a practice deservedly held in great estimation among the people of the eastern world,

* Being convinced of the agreeableness, as well as salubrity of champooing, and the Asiatic mode of vapour bathing, I hope, ere long, to have it in my power to introduce the practice into Great Britain.

who often use it (independantly of disease) as a pleasant and healthy exercise.

I have frequently relieved, and at times intirely removed violent paroxysms of gout, by directing the parts to be held over steam, arising from boiling water, poured into a vessel, and covered with flannel, to render the vapour more lasting.

I received a cure in a severely diseased knee joint, that long rendered me a complete cripple, by steam, applied to the part, with medicated friction; (the strength of the whole limb was afterwards restored by the cold bath) after the assistance of some of the most able in the profession, had been exhausted in vain to relieve me.

CONCLUSION.

I Have to inform the Public, that I have used the Saline Waters of Hampstead, not only in private practice, but on a more extensive scale, in consequence of my attendance, last year, on the poor of the parish of Hampstead in an official capacity, and from the circumstance of my having been appointed surgeon and apothecary to the Parochial Benefit Society, lately established at that place, upon the admirable principles of rendering private industry the basis of public bounty. Being intimately acquainted with the usefulness of this benevolent institution, and requested by the late philanthropic William Bleamire, Esq. its principal founder, whom I professionally attended while living here) to promote its interest, as much as possible ; and being, at the same time, a hearty well-wisher to all the sober and industrious members of society, I cannot forbear giving a statement of the principles upon

which it has been founded, and the very excellent laws and regulations by which it is governed, hoping that the *benevolent spirit* of this Society may be *diffused*, and the *plan adopted throughout the whole country*. It is certainly an inducement to temperance, industry, and frugality in those persons, whose welfare it is intended to promote; and although there are 7,000 benefit clubs in England, there are none formed exactly on the model of this institution.

Much care was employed by the founders, the ablest authorities consulted, and many anxious hours occupied in framing and bringing it into its present state.

The principal inhabitants are its benevolent supporters, and it must of course be more stable (as the book containing the articles expresses) than those benefit societies, whose funds have often failed, or been shamefully misapplied through the ignorance, or knavery of those to

whom the management of such funds may have been entrusted, and from which the members when old age, sickness, or other infirmity has rendered them objects of relief, have been often left to deplore their destitute condition under the severest pangs of disappointment and distress. The funds of the Hampstead Benefit Society are however placed on the most permanent and unalienable security, and the impartial punctuality, with which its benefits are distributed, under the superintendence of the leading and most respectable inhabitants of the village, is a very superior and important advantage to the members. It possesses also other moral and political good, which will appear from the perusal, and due consideration of the following regulations.

ARTICLE I.

That the Society shall consist of a President, a Vice-President, a Treasurer, a Secretary, and as many Members as it shall be thought proper, from time to time, to admit; that it shall take place and commence upon Tuesday the ninth day

of February 1802, at ten o'clock in the morning, on which day it shall meet, for the first time, at the Assembly House at Hampstead, and afterwards at the same, or such other house or place as shall be judged fit or proper, on the last Monday in every month from Lady-day to Michaelmas from seven to nine, and from Michaelmas to Lady-day from six to eight o'clock in the evening, during which times all the business belonging to the Society shall be transacted.

II. That every inhabitant or other person who shall contribute One Guinea or more annually, or not less than Ten Guineas at one time, shall be deemed a Guardian of the Society ; but that such contributor shall not, in consequence of such contribution, be entitled to, or receive any benefit whatever from its Funds.

III. That journeymen, mechanics, labourers, and other persons resident within the parish, who shall be not less than twenty-one and not more than forty years of age, desirous of becoming beneficiary Members of the Society, shall be proposed at a monthly meeting, and upon producing, at the following monthly meeting, satisfactory testimonials of their health, sobriety, industry, and good conduct, shall be deemed admissible, and, with the assent and approbation of three-fourths of the Members present, shall become Members from the day of their election upon the following terms, viz.

TERMS OF SUBSCRIPTION.

IV. That all those, being within the ages before men-

tioned, who shall subscribe 1s. 4d. a month, shall be deemed Members of the First Class; all those who shall subscribe 2s. a month, Members of the Second Class; and all those who shall subscribe 2s. 8d. a month, Members of the Third Class; that each beneficiary Member shall also pay 4d. monthly to be spent; but that he may exonerate himself from the payment of this liquor-money by paying his subscription to the Secretary before the time of meeting, or at the meeting by a Member present.

V. That every person upon his admission shall pay the amount of one month's subscription in advance for his entrance, and 1s. for these Rules, and make and subscribe the following declaration, (that is to say,) " I solemnly declare " that to the best of my knowledge I am of the age of " ; that I am in good health; and have " not any concealed distemper or infirmity; that I will at all " times conform to the Rules of this Society, and endeavour " upon all occasions to promote its prosperity, and preserve " peace, harmony, and good-will amongst all its Members."

VI. That no Member shall be entitled to any benefit from this Society until he has been one year a Member, and has conformed, in all particulars, to the Rules of the Society. But that if he shall, at any time before the end of the first year, pay up his subscription for the whole year, he shall, in such case, be entitled to enjoy the same privileges as other Members who have regularly paid their subscriptions for one year.

VII. That if any Member shall be sick and unable to follow his usual labour before he has been admitted one year, he shall, in such case, not only be excused from paying his subscription, but shall be afforded such assistance as the nature of his situation may require.

VIII. That every Member who shall omit to pay his subscriptions regularly, shall forfeit, for the first neglect 3*d.*, for the second 6*d.*; and that if he neglect for three monthly nights together, or, being in the room, shall quit it before he pays his subscription, he shall be struck off the Society's book.

IX. That whoever shall come into the Meeting Room disguised in liquor, shall use any profane, indecent, or abusive language, or shall introduce or hold any discourse upon religion, politics, or any other subject, during the time of business, after being called to order by the Chairman, shall forfeit, if a beneficiary Subscriber, 6*d.*; but if a Guardian or a Steward, he shall forfeit, 2*s.* 6*d.* for every offence.

X. That no more liquor shall be brought into the Meeting-room during the hours of business than the groats paid by the Members present will satisfy.

BENEFITS OF SUBSCRIPTION.

XI. 1st. That every Member of the First Class shall be allowed 9*s.* a week during sickness; that if he die his widow shall receive 3*l.* for her immediate support, and a further sum of 4*l.* for the furnishing of his funeral; and that if his

wife die in his life-time, he shall be entitled to 3*l.* for the purpose of enabling him to carry her with greater decency to the grave.

2dly. That every Member of the Second Class shall be allowed 12*s.* a week during sickness; that if he die his widow shall receive 3*l.* 15*s.* for her immediate support, and a further sum of 5*l.* 5*s.* for his funeral; and that if his wife die in his life-time, he shall be entitled to 4*l.* for her funeral.

3dly. That every Member of the Third Class shall be allowed 15*s.* a week in sickness; that if he die his widow shall receive 5*l.* for her immediate support, and 6*l.* 6*s.* for his funeral; and that if his wife die in his life-time, he shall be allowed 5*l.* for her funeral.

XII. That every Member of the First Class shall be allowed 18*s.* upon his wife's lying-in, towards furnishing her with child-bed linen, and other necessaries; that every Member of the Second Class shall, on the like event, be allowed 1*l.* 4*s.* for the like purpose; and that every Member of the Third Class shall, on the like event, be allowed 1*l.* 10*s.* for the like purpose. And also such further sum for the funeral of a child, and such weekly allowance to the widow and children of a deceased Member, as the state of the funds will admit of.

XIII. That no Member shall pay his subscription while he continues on the Box as a sick person, or while he remains

in prison for debt: and that no allowance shall be made for the funeral of any Member committing suicide or dying by the hands of justice, or who shall be under confinement upon any treasonable or felonious charge.

XIV. That if any Member shall be taken ill while he is employed in his usual work or labour out of the parish, and shall not be able to return to his own habitation in it, he shall, in such case, be paid the sick allowance upon sending a certificate to the Treasurer of the state of his health, signed by a medical person and the clergyman of the parish where he shall then reside; and such allowance shall be continued to him so long as a like certificate shall be produced to the Treasurer.

XV. That if any Member shall remove out of the parish with an intent to settle and reside out of it, such Member shall no longer be considered as belonging to this Society: But that, in such case, all the subscription money which he shall have then paid in shall be returned to him, deducting only, if any, the sums which may have been paid to him.

XVI. That the subscription of every Member shall cease on his attaining sixty years of age; that from that period those of the First Class shall be entitled to 6*l.* a year, payable quarterly, until they attain the age of seventy, and from that period shall receive quarterly 8*l.* a year for the remainder of their lives: that those of the Second Class shall receive 7*l.* a year from sixty to the age of seventy, and from that period 9*l.*

a year during the remainder of their lives : and that those of the third class shall receive 8/. a year from sixty to the age of seventy, and from that period 10/. a year during the remainder of their lives : That besides these advantages, an allowance shall be made for the funerals of these superannuated Members and of their wives at the discretion of the Society ; that an Apothecary shall be appointed to attend these Members and their families gratis during the time of sickness ; and that in case of the death of any of the family of a beneficiary Member, the Guardians shall have authority to make such further allowance to the survivors as they may in their discretion judge proper, according to the nature and circumstances of the case.

XVII. That if any beneficiary Member shall be drawn for the Militia and shall not choose to serve, nor be excused by reason of any exemption in the Militia Acts, then such sum as may be required to find a Substitute shall be paid out of the Funds of the Society ; and the Member so drawn, as well as every other member liable to serve, shall pay 1s. towards it.

XVIII. That if any Member, being sick, lame, or infirm, wish to go into an Hospital, the Society, at any Monthly Meeting, may direct the Treasurer to advance the sum necessary to be paid upon his admission ; that during his continuance therein, the sick allowance shall be continued ; and that his monthly subscription shall not be payable until his health be restored.

XVIII. That when the funds of the Society shall amount to 200/. and upwards, the Guardians, with the approbation of the Members present at any meeting, shall lend any sum not exceeding 10/. to a Member, to enable him to improve his situation in life, upon his giving a note with one surety to repay the same by instalments, without interest.

XX. That an Apothecary shall be appointed to visit, at any time when required, not only the sick Members, but their wives and families.

MANAGEMENT OF THE SOCIETY.

XXI. That a President, a Vice-President, and a Treasurer, shall be appointed out of the Guardians: That in their absence at any meeting, one of the Guardians present shall take the Chair; that if no Guardian shall be present, any other Member shall be eligible thereto; and those who preside shall keep due order, decorum, and decency in the Society, particularly during the hours of business on the monthly nights, when the Meeting is to break up at the times appointed; and if any Member continue in the room after the business is ended, or shall go himself or invite other Members to go from thence to any public house for the purpose of tippling, he shall, for each offence, forfeit 1s.

XXII. That a Secretary shall be chosen, with the approbation of the major part of the members present at a general meeting; that the said secretary shall attend all meetings, re-

ceive donations, subscriptions, and fines, pay the same over to the Treasurer, and perform all such other matters and things from time to time as shall be required of him.

XXIII. That all voluntary contributions and donations, all annual and monthly subscriptions, and all penalties and forfeitures, shall constitute one Fund, to be under the management and direction of the Guardians, who shall invest the surplus monies from time to time in the public Funds, in the names of the President and the Treasurer for the time being.

XXIV. The four General Meetings shall be holden every year, viz. on the first Monthly meeting nights after Lady-day, Midsummer-day, Michaelmas-day, and Christmas-day, at which two or more Stewards shall be appointed in rotation as they stand upon the list of admittance, and all general business transacted; and that every member who shall be nominated a Steward and refuse to serve, shall forfeit 5s. unless he offer such an excuse as shall be approved of by the Members present. But no Guardian shall be nominated to serve the office of Steward without his own consent.

XXV. That the Steward shall attend all meetings, and assist in collecting subscriptions and forfeitures, and in keeping order; that they shall visit the sick Members twice a week, pay their allowance regularly at the time appointed, and see that proper care is taken of them, and in case of death, shall take care that the funeral be not only decently

performed, but that it be attended by themselves, and at least five more members, who stand in rotation upon the books ; and that for neglect in any of these particulars, unless prevented by unavoidable accident, they shall respectively forfeit 1s. for every neglect.

XXVI. That every Member who means to declare on the Box, on account of sickness, or any other infirmity, shall send a note in writing to the Secretary, signifying his intention ; that the Secretary shall, on receiving such notice, without delay, request the Apothecary appointed by the Society to call upon such Member, and examine into the state of his health ; that if the Apothecary be of opinion that such Member is a proper object to be admitted on the Box, and shall report the same in writing to the Secretary, the Secretary shall immediately acquaint the Steward whose turn it is to visit such sick Member ; that the Steward shall thereupon receive the allowance of such sick Member from the Treasurer, upon producing a note from the Secretary, so long as such sick Member shall continue upon the Box, and shall pay it regularly over to him ; but that no member shall receive any benefit from this society, whose illness or infirmity shall arise from quarrelling, drunkenness, or fighting.

XXVII. That if it shall be discovered at any time that any Member shall have been guilty of any fraud or imposition in procuring his introduction into this Society ; or shall obtain the sick allowance, by feigning illness ; or shall at any time, while he received the sick allowance, be seen work-

ing at his trade or business for gain, or shall be disguised in liquor, or be found tippling, or gaming in or out of an ale-house, he shall be expelled the Society.

XXVIII. That the Society shall have power at any Quarterly Meeting to reinstate any discarded member, if they shall see just cause for so doing; notice for any application to bring such business forward, having been given at the preceding Monthly Meeting.

XXIX. That in order to unite all the industrious and deserving parishioners and inhabitants of Hampstead in one uniform plan, for their mutual advantage and happiness, the Society may, from time to time, at any quarterly or Monthly Meeting, treat with the whole or any member of any club or society now established in this parish, for their becoming Members of this institution, upon such terms as may be thought just and reasonable.

XXX. That an Anniversary Sermon shall be preached, at which all the Members of this institution shall, if health permit, attend, or forfeit one shilling: that after attending such sermon, they shall dine together at such place as shall be agreed upon at the preceding Quarterly Meeting: that each Member shall pay 3s. toward the expence of the said dinner: That the dinner shall be provided by the Stewards, with the approbation of the President: and that at such Anniversary Meeting, a statement of the Society's cash account shall be

laid before the meeting, and, if there be no objection thereto, printed for the use of the Members.

XXXI. That it is impossible, by any general rules to meet every case that may occur in conducting this Society, it is hereby declared, and mutually agreed, that if any question, dispute, matter, or thing, shall arise, which cannot be determined by the plain intent and meaning of these articles, or if it shall be found necessary at any time to add to, or alter any of them, for the benefit and advantage of the beneficiary Members and their Families, the consideration of the same shall be submitted at a Quarterly Meeting, to the arbitration of a Committee of Seven, the President and three Guardians to be of the number, and that their determination shall be final and conclusive.*

BEFORE I take my leave, I have to acquaint the Public, that in addition to my own experience of the Saline Waters of Hampstead, they have also been approved, and have received the sanction of the Physicians, they have been shewn to, as

* This Parochial Benefit Club is at present conducted principally under the superintendence of the patriotic and much respected Josiah Boydell Esq. (one of the Magistrates of this village,) and several other Gentlemen.

Drs. Latham, R. Pearson, Vaughan, Mayo, Marshall, Budd, Howarth, Thynne, and many others. '

As this place is so richly gifted with mineral and other excellent waters, fine prospects, wholesome air, &c. it cannot fail to be (to numbers whose avocations in life are much connected with the capital) an important disideratum; also where warm or cold bathing* is deemed proper, (in either salt or fresh water,) while persons are out of town for the benefit of their health; it may be here resorted to, at pleasure upon the plan I have stated in this work, and where prejudice does not rootedly prevail, with nearly the same effect as at the sea side.

I am well aware that I have been more diffuse, than many perhaps may deem necessary; but as a mere Analysis is often complained of as dry

* Shower or slipper baths may be hired of Mr. Watson, Ironmonger, in the High-street, Hampstead.

and uninteresting, and as this work is intended not only for a few scientific readers, but also for public utility, I have, by various chemical, medical, and philosophical information, notes, &c. (and by a statement of the modern practice of curing diseases, by the extensive power of waters judiciously exhibited), endeavoured, as much, as my leisure would admit, to blend the utile with the dulce, or the agreeable with the useful; my chief study however has been to render it as plain as I could, by avoiding useless refinement; and I can aver, that my researches have been unfeignedly directed for the relief of the afflicted.

I have to acknowledge that I do not profess to be acquainted with the full powers of the different waters at Hampstead, treated of, in the foregoing pages: Perhaps I might exclaim with the poet!

“And who their virtues can declare? who pierce
With vision pure, into these secret stores
Of health, and life, and joy?”

FINIS.

C. and R. Baldwin, Printers,
New Bridge-street, London.

ERRATA.

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